

DP-300479

PLASMA REACTOR FOR TREATING AUTO EMISSIONS - DURABLE
AND LOW COST - CURVED SHAPES

ABSTRACT OF THE DISCLOSURE

A non-thermal plasma reactor for conversion of exhaust gas constituents is characterized by a reactor element prepared from a curved, swept-shaped substrate specifically designed for fabrication via extrusion. The as-extruded curved substrate comprises a thick outer wall surrounding a plurality of channels separated by dielectric barriers. Selected channels are coated with a conductive material to form conductor channels. The prepared reactor element preferably comprises multiple concentric exhaust channels, multiple concentric conductor channels having alternating polarity, each connected to its respective polarity via bus paths, in-line structural support ligaments for providing optimal structural support while preventing exhaust leakage, and thick outer walls providing high crush resistance and allowing robust mounting into the reactor housing.

The nested, concentric arrangement and curved shape substrate advantageously enhances the reactor's ability to adapt to fit various vehicle sizes. High durability is afforded by the thick outer walls, and preferably, the inclusion of integral structural support ligaments. Fabrication of the extruded curved substrate is from material such as, but not limited to, dense cordierite, alumina, titania, mullite, plastic, and other high dielectric constant materials, or combinations thereof. Improved wall thickness is achieved over prior ceramic plate designs, thus providing the advantage of a more uniform electrical response. Improved resistance to voltage leakage is achieved by containing the channel conductors within dielectric channels (except at ends) and providing a dielectric coating at each end to prevent voltage leaks there.